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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,795	03/23/2004	Lawrence Liu	61994.00013	4393
30256	7590	11/17/2006		
SQUIRE, SANDERS & DEMPSEY L.L.P				
PATENT DEPARTMENT				
ONE MARITIME PLAZA, SUITE 300				
SAN FRANCISCO, CA 94111-3492				
			EXAMINER	
			ANDUJAR, LEONARDO	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/807,795

Applicant(s)

LIU ET AL.

Examiner

Leonardo Andújar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-7 and 19-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of species 1 in the reply filed on 08/30/2006 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

2. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 16 recites the limitation "the second dielectric layer" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu et al. (US 6,146,950) in view of Okada et al. (US 6,383,910)
6. Regarding claim 8, Sheu (figs. 2A-2I) shows most aspects of the instant invention including method of manufacturing a mask read only memory, comprising: providing a semiconductor structure 200-226 having a first opening 332 therein (e.g. fig. 2E); forming a first glue layer 234 on a surface of the semiconductor structure extending into the first opening (e.g. fig. 2G); forming a contact plug 343 within the semiconductor

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structure, the contact plug comprises a first metal layer 242 therein and a first glue layer thereon; etching the first glue layer outside the contact plug in order to expose the surface of the semiconductor structure (col. 6/lis. 13-26); forming a patterned photoresist layer 236 on the semiconductor structure (e.g. fig. 2G); forming a plurality of code areas 240 in the semiconductor structure by using the patterned photoresist layer as a mask; removing the patterned photoresist layer (e.g. fig. 2H). Sheu teaches that more than two interconnection levels can be formed (col. 6/lis. 52-59) but does not disclose the step of forming a second glue layer on the semiconductor structure. Okada (e.g. fig. 7C) teaches a semiconductor structure (1, 2, 25) having an opening including a first glue layer 31, a plug 33 (i.e. plug 33 formed in dielectric layer 25) and a second glue layer 33 over the semiconductor structure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the step of forming a second glue layer on the semiconductor structure disclosed by Sheu as suggested by Okada to increase the number of interconnect layers to obtain a higher device packing density of devices and executional efficiency suggested by Sheu.

7. Regarding claim 9, Sheu shows that the semiconductor structure comprises a plurality of buried bit lines 212 therein and a first dielectric layer thereon.

8. Regarding claim 10, Sheu plurality of code areas is formed between two of the buried bit lines.

9. Regarding claim 11, Sheu teaches that the first metal layer is deposited to cover the first glue layer.

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10. Regarding claim 12, Okada teaches that planarizing the first metal layer forms the contact plug (col. 9/lls. 47-50).

11. Regarding claim 13, Sheu does not explicitly disclose that the layer 242 is made of tungsten. However, Sheu teaches that tungsten is a suitable material for plugs (col. 4/lls. 39-50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the plug 342 of Sheu of tungsten, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

12. Regarding claim 14, Okada teaches that etching the first glue layer outside the contact plug in order to expose the surface of the semiconductor structure comprises a blanket etching back process (col. 6/lls. 15-19).

13. Regarding claim 15, Sheu teaches that plurality of code areas in the semiconductor structure by using an ion implantation process 238 (e.g. fig. 2G).

14. Regarding claim 16 (as understood), Sheu teaches that a second dielectric layer 214 formed from BPSG.

15. Regarding claim 17, Sheu teaches that the first glue layer is Ti/TiN (col. 5/lls. 40-47).

16. Regarding claim 18, Sheu in view of Okada teaches the second glue layer is a barrier layer but does not explicitly teach that it is made of Ti/TiN. However, Sheu teaches that Ti/TiN is a suitable material a barrier layer (col. 5/lls. 40-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made

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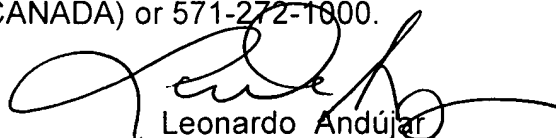
to make second glue layer of Sheu in view of Okada of Ti/TiN, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

### ***Conclusion***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Leonardo Andújar

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Primary Examiner  
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1/10/2006